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ABSTRACT

Many of the issues confronting schools and society relate to the changing roles of males and females. Concern has also been expressed over the preparedness of graduates to face an uncertain job market and rapid technological change. To study the relationship between school subject choice and career opportunities for Australian youth, school records and other data were analyzed. The results indicated that for subjects involving student choice, girls tended toward art/crafts, home economics, secretarial, and culturally oriented classes. Boys chose manual arts, technological, and scientific options. The findings suggest that further research is required to clarify the role of school policies and practices in determining sex differences in subject choice. (JAC)

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Discussion Paper No. 11

GIRLS, BOYS AND SUBJECT CHOICE

A report on sex differences in participation rates in subjects in Western Australian Government secondary schools

Sandra Brown
Jim Fitzpatrick

U.S. DEPARTMENT OF EDUCATION
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FOREWORD

This report is the first to arise from a project being undertaken by members of the Research Branch of the Education Department, examining sex differences in subject choice in Government secondary schools in Western Australia. The first phase of the project, conducted in 1980, analysed the nature and extent of sex differences in enrolments in the various courses offered in secondary schools throughout the State. This report describes and discusses the results of the investigation.

The remainder of the research project - the focus of 1981 activities - is to study the subject choice process, and will be reported in early 1982. The aim is to identify school policies and practices which contribute to or counteract sex differences in subject choice, and to try to assess their relative importance and how they interact. In particular, it is hoped to identify unnecessary sex-based constraints and pressures which, unwittingly or otherwise, are placed on girls' and boys' subject choices.

This project is a significant initiative in the Western Australian Education Department's attempt to understand the bases for differing participation rates of boys and girls in school subjects. The project is partly supported by the Commonwealth Education Department's Transition from School to Work Programme, since there are strong associations between school subject choices and subsequent career choices.

I would like to extend my thanks to the authors of this report, Ms Sandra Brown and Dr Jim Fitzpatrick.

D. Mossenson

DIRECTOR-GENERAL OF EDUCATION

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1.0 INTRODUCTION

Students in Western Australian government secondary schools have many opportunities to select subjects and courses they wish to pursue. The range of choices available provides a diversity of educational experience, enabling students to tailor studies to their own interests and aspirations. This report focuses upon the similarities and differences in choices which boys and girls make when selecting amongst the various school subjects offered.

An examination of sex differences in subject choice is especially timely. Many of the issues confronting schools and society relate to the changing roles of males and females. The last few decades have seen a considerble alteration in the expectations relating to the behaviour of men and women. For instance, with women now making up 36 per cent of the Australian workforce (Women's Bureau, 1980), 'long-term' employment is now almost as much a part of many girls' futures as it is for boys. There are increasing numbers of women entering traditionally male occupations such as engineering, science and technology, and more men are entering occupations such as nursing, hairdressing and primary teaching.

Nevertheless, there is still a strong male-female workforce dichotomy, and it is of concern to many. Some industry leaders lament the lack of skilled engineers and scientists; they recognize that girls could fill the positions, but are aware that a disturbingly low proportion of girls take higher maths courses in secondary school, and that this effectively prevents them from entering scientific professions. As a result, private companies have, for example, recently sponsored a major study into this phenomenon in Victoria (Walsh, 1977). Others rue the lack of skilled tradesmen in certain areas; yet few women apply for apprenticeship positions, and even fewer have been enrolled (Calvert, 1980).

This report also comes at a time when concerns are being expressed over the preparedness of school leavers to cope with an uncertain employment market and rapid technological change. These concerns have led to many recommendations and policies being implemented in schools, since it is recognized that as well as merely reflecting social change, schools constitute a vehicle for shaping our society. The Meyers Report (1980, p.104) emphasized the relationship between school subject choice and career opportunities, noting that restricted subject choice is a crucial factor in reducing career opportunities, particularly for girls. The subject is being specifically looked at in South Australia (O'Brien, 1980).

It is Education Department policy that students should be able to avail themselves of educational opportunities, including the widest range of subject choice, without facing formal or informal barriers due to their sex. However, there has been little research into the nature and extent of sex differences in subject choice in schools. This report, in providing documentation of present day patterns and changes over the past decade, should serve as a useful background to policy makers and practitioners who are concerned with this aspect of education.

1.1 Overview of the Report

In Chapter 2 the course and subject choice patterns open to students in government secondary schools in Western Australia are outlined and the participation rates of girls and boys presented. In Chapter 3 trends in these participation rates over the past decade are examined. In Chapter 4 the question of whether or not there are

significant differences between schools in participation rates of boys and girls is considered. In Chapter 5 the age at which distinctive enrolment patterns for boys and girls emerge in various subjects and courses is investigated. In Chapter 6 findings are summarized, and the implications and suggestions for further research are briefly considered.

1.2 Data Sources

The report is based upon an analysis of 1979 records supplied by the Board of Secondary Education. Data relating to Year 12 students list the numbers of boys and girls in each Government secondary school in each subject who sat for Tertiary Admissions or Certificate of Secondary Education Examinations at the completion of their Year 12 studies. The records for students in Years 8, 9 and 10 list the number of students in each government secondary school enrolled in most option subjects. Data from other studies and sources are used, where appropriate, to illustrate trends or other points of interest. In particular, the Education Department provided information on the Year 11 Vocational Business Studies and Alternative Courses, and the Division of Industrial Training, Department of Labour and Industry, furnished data on apprenticeships.

2.Ø SEX DIFFERENCES IN SUBJECT CHOICE IN SECONDARY SCHOOLS

In Western Australia students must remain in school until the end of the year in which they turn 15, unless given Ministerial approval to leave earlier. As a result, about 93 per cent of the students who begin Year 8 complete Year 1Ø. At this point students face several alternatives:

1. They may leave secondary school for

    a. employment (or unemployment);
    b. Technical and Further Education in Government technical schools (full- time or part-time), including pre-apprenticeship programmes;
    c further education in commercial schools (secretarial courses, for example); or
    d. apprenticeships or other on-the-job training programmes, which may or may not include formal full-time or part-time education.

2. They may remain in secondary school and, essentially, choose between

    a. non-tertiary oriented courses which usually terminate at the end of Year 11 (Vocational Business Studies or Alternative Courses); or
    b. tertiary-oriented or general courses, normally taken over Years 11 and 12.

This report focuses on the secondary school students, rather than on those who have left school. However, sex differences in some post-school alternatives are discussed, as they provide some valuable insights into

subject choice patterns. This chapter firstly outlines the participation rates of girls and boys in various subjects taken in Years 8 to 10 (section 2.1). It then briefly examines some aspects of sex differences in technical and apprentice education (section 2.2). Finally, the various Years 11 and 12 courses and subjects offered in secondary schools are examined (section 2.3).

2.1 The Achievement Certificate: Years 8-10

The Achievement Certificate, the certification system used by all Government secondary schools in Western Australia, involves a continuous and cumulative assessment of each student's progress over a three-year period in lower secondary school.

Subjects in the Achievement Certificate are organized into three groups.

2.1.1 Core Subjects

There are four compulsory core subjects; mathematics, English, science and social studies. These are offered at several levels of difficulty, reflecting the varying abilities of students. Although this report does not examine differences between the proportions of boys and girls enrolled in these levels, Ryan (1977) did so in her study of 1974 achievement levels of Western Australian students. She found that in mathematics and science there were no substantial differences between girls' and boys' levels, but in English and social studies girls achieved at higher levels than boys.

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2.1.2 Personal Development Subjects

Schools also offer personal development units such as physical education, health education and human relations. Physical education is taught in all schools and participation is normally compulsory for every student. As well, an additional physical education option may be offered; 88 schools chose to do so in 1979. Health education and human relations units are not required to be taught. However, in 1979, 69 schools opted to offer either or both subjects at the Year 10 level.

This report does not examine enrolment patterns in these subjects, although there are differences in the ways they are offered to girls and boys. For example, single-sex classes are the norm in compulsory physical education. However, co-educational classes are increasingly frequent at the Year 8 level, and physical education and outdoor education options in Years 10 to 12 are predominantly co-educational.

2.1.3 Option Subjects

Each year a student must complete several units of option subjects. The number of options a student takes depends on the workload associated with each, and this varies. For instance, while one student may take two language options, another student could enrol in photography, food and nutrition, woodwork and pottery. (Appendix I lists the option subjects offered in Western Australian lower secondary schools in 1979, the number of schools in which they were offered, and Year 10 enrolments.)

It is within the option subject area that lower secondary school students have some opportunity to choose according to their inclinations. The option subjects may be important in several respects. Some are prerequisites to certain subjects, while others help develop attitudes and skills which will lead students into occupations and leisure activities which may shape important aspects of their lives.

The range of certified option subjects offered is extensive, and includes enrichment units in the compulsory core subjects (for example, mathematics enrichment or science enrichment). The wide variety caters for differing pupil and teacher interests, expertise, demand, and the existence of specialized facilities. In Western Australia in 1979, there were 119 BSE-approved option subjects taken by Year 10 students in Government secondary schools. On average, each school offered 22, ranging from as many as 44 in one metropolitan school, to as few as 8 in one small rural school.

Most schools offer a similar array of options, usually including food and nutrition, clothing and fabrics, woodwork and metalwork, but the size and location of a school generally affect the range and nature of options offered. For example, specialist staff in subject areas such as music and languages are normally more readily available in larger schools or in those located near larger rural communities or in the metropolitan area. However, there are notable exceptions: one school, for instance, with less than 50 Year 10 students, offered 32 option subjects in 1979.

The following points concern only the 66 Year 10 option subjects which were taken in five or more schools. Those taken in less than five schools usually had so few enrolments that a statistical analysis and description is of little value.

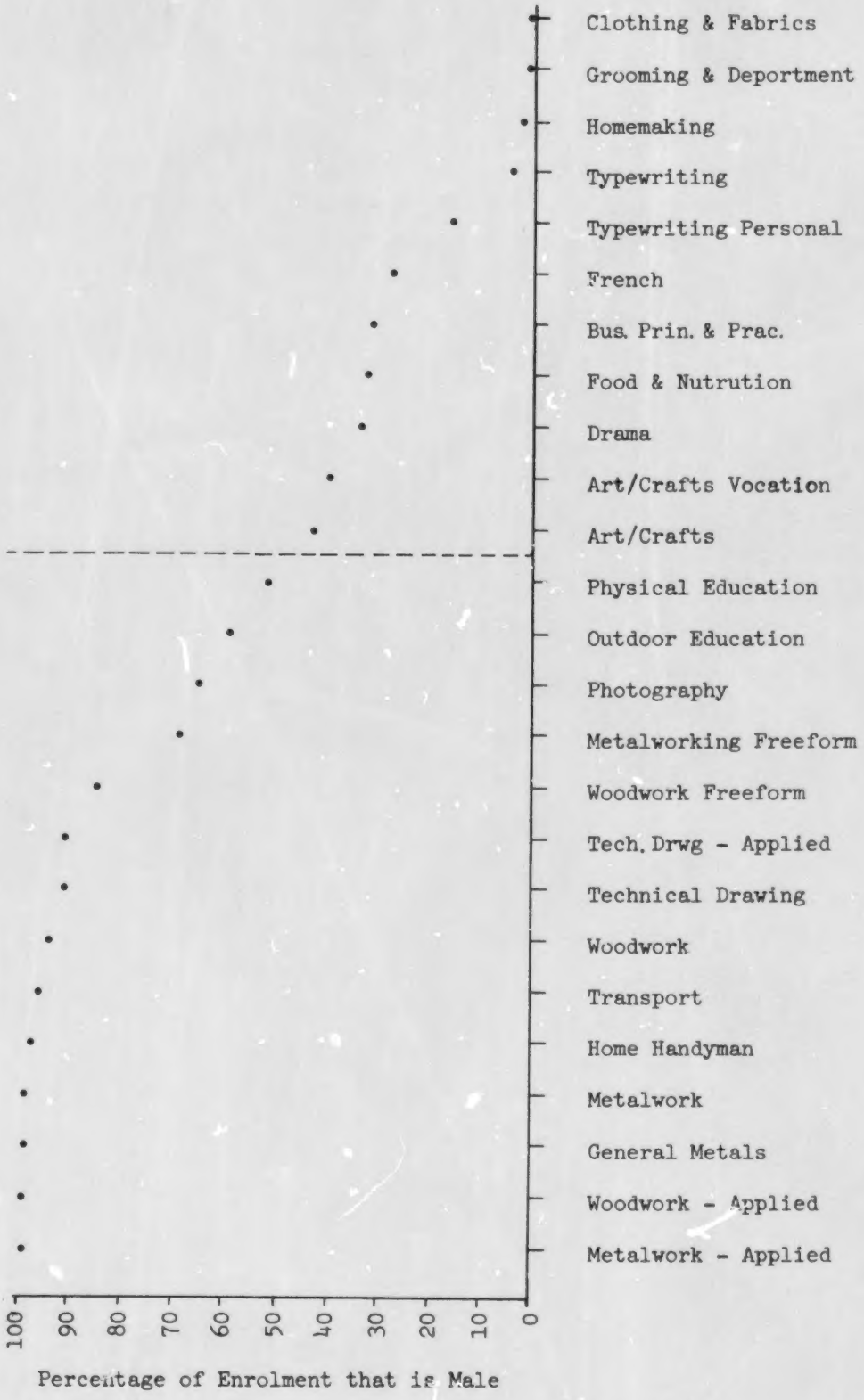
The option subject enrolment patterns show that:

1. In no school are there enrolments of both boys and girls in every subject. On average, each school offered four subjects which were taken exclusively by girls, and six exclusively by boys. In the extreme instance, 20 of the 32 Year 10 option subjects offered in one school had single-sex enrolment.

2. Although the majority of subjects in most schools enrol both boys and girls, most subjects commonly enrol more of one sex than the other. Figure 1 shows the 25 Year 10 option subjects that were offered in more than 40 schools in 1979, ranked according to the percentage of boys and girls enrolled in them. The dozen most heavily enrolled subjects for boys and girls respectively are listed in Table 1; only four of the subjects are common to both lists. It is evident that French, art/craft, home economics, secretarial and culturally oriented subjects are predominantly the domain of girls; manual arts, technological and scientific options are the domain of boys.

FIGURE 1

PERCENTAGE OF MALES ENROLLED IN YEAR 10 OPTION SUBJECTS OFFERED IN MORE THAN 40 SCHOOLS: 1979



3. Option subjects with relatively equal enrolments of boys and girls are a minority.

4. Most students, during some part of their school week, take part in several classes in which sex stereotyping is evident.

TABLE 1

THE MOST HEAVILY ENROLLED YEAR 10 OPTION SUBJECTS: 1979

MALES		FEMALES	
Subject	Number Enrolled	Subject	Number Enrolled
Woodwork	4381	*Food & Nutrition	4193
Metalwork	3760	Typewriting	3448
Transport	2976	Clothing & Fabrics	3099
Technical Drawing	2656	Business Principles and Practice	2100
Home Handyman	2595		
*Art/Crafts	2417	Typewriting Personal	1951
*Food & Nutrition	2094	Grooming & Deportment	1860
Woodwork Applied	1650	*Art/Crafts	1818
*Photography	1530	*Outdoor Education	1463
General Metal	1267	Homemaking	1253
Woodwork Freeform	1028	Drama	1102
*Outdoor Education	1015	*Photography	791
		French	646

* Subjects common to both lists

2.2 Leaving Secondary School

Upon terminating compulsory schooling, many students enter apprenticeship or pre-apprenticeship training, or technical institutions. There are marked sex differences in participation rates in these areas. For example, in 1979, 4 587 14-and 15-year-old students enrolled full-time or part-time in TAFE courses; only 37 per cent were girls.

Apprenticeship programmes in Western Australia are essentially the province of young males, although there are no formal restrictions against females. Of the 13 138 registered apprentices on 30 June 1980, only 992 (7.6%) were female. Of this total, 908 were in ladies or mens hairdressing and 30 in cooking. Excluding these categories, there were only 54 female apprentices in all other trades in Western Australia, only .4 per cent of the total. Interestingly, several persons interviewed suggested that, aside from hairdressing, the other 'womens' trades' were cooking and pastry cooking. Yet women accounted for only 30 of 336 (8.9%) apprentice cooks and only 1 of 61 (1.6%) pastry cooks in 1980.

Pre-apprenticeship training is a one-year technical education providing students with basic skills associated with a particular trade. Of 1 223 applicants for the 1981 programmes, only 39 (3.2%) were women. Of these women, 25 applied for the dental technician or baking and pastry cook programmes.

2.3 Non-Tertiary Oriented Upper Secondary Students: Year 11

During the 1970s, an increasing number of students continued on to Year 11 but were not interested in the more traditional tertiary-oriented studies. Among several responses to this situation were the development of a Year 11 Vocational Business Studies Course and Alternative Courses.

2.3.1 Vocational Business Studies Courses

The one-year Vocational Business Studies Course is certificated by the Education Department. It began in 1969, and is intended for those students who are academically capable of continuing beyond Year 10, but are not interested in preparing for tertiary studies.

The course provides skills and knowledge for such occupations as shorthand-typist, clerk, and receptionist. No previous experience in commercial subjects is necessary to enrol in either of the two basic courses offered - stenography or receptionist. Both courses offer typewriting, English, business mathematics, general bookkeeping, office practice and machines, and optional studies such as commercial law and economics. Work experience is an integral part of the programme. With the tightening job market in the 1970s, there has been a trend for staff to encourage students to take up employment if it becomes available during their training period, rather than complete the course. Although exact figures are not known, estimates in late 1980 suggest that only about two-thirds to three-quarters of the students now formally complete the course and receive a Certificate.

In February, 1980, Vocational Business Studies was offered in 50 senior high schools. There were a total of 1 190 females and only 33 males in the stenography and receptionist courses; the Vocational Business Studies Course is essentially the province of females. However, another 178 females and 175 males were enrolled in various Vocational Business Studies classes, but not as part of an integrated programme leading to a Certificate.

2.3.2 Alternative Courses

Alternative Courses are another programme catering for non-tertiary bound students. The courses are certificated by the individual schools, and staffing is still largely dependent upon volunteers both from outside school and from the school's existing staff.

A survey of 34 schools in 1979 (Lankester 1980) showed that the emphasis of the courses was upon developing personal qualities, trade and general employment skills, and upgrading Achievement Certificate core subject results. Work experience was either voluntary or compulsory in all but one of the schools. Most Alternative Courses offer a mixture of compulsory and optional school-based subjects, and a variety of CSE and TAE subjects are involved in some of the programmes.

By early 1980, 39 schools offered alternative courses, with a total enrolment of 925 students. The Alternative Course enrolment was 75 per cent male, in both metropolitan and non-metropolitan areas.

2.4 Tertiary Oriented Upper Secondary School Students: Year 12

At August, 1979, there were 5 Ø57 students enrolled in Year 12 in 67 Government schools, in the final year of a two-year course. Although not all go on to tertiary studies, many do, and the focus of most instruction and administration in the Years 11 and 12 courses is to prepare students for study at the tertiary level.

Although most schools offer similar subjects in Years 11 and 12, there are four special cases. These are the exclusively argicultural senior high schools at Cunderdin and Denmark, and the agricultural wings at Harvey and Narrogin District High Schools. Students at the four schools (a total of 112 boys and 1 girl) enrol in the same seven farm-oriented subjects. As a result of their specialized function, identical subject patterns, and essentially male enrolment, these agricultural schools or wings have been excluded from subsequent discussions, unless otherwise noted.

The dozen most heavily enrolled Year 12 subjects in 1979, as measured by total enrolments, are ranked for girls and boys in Table 2; eight were common to both sexes. However there were strikingly different trends in boys' and girls' non-common subject enrolment patterns. Whereas boys tended to enrol in physics, mathematics II and III and accounting, girls tended to enrol in English literature, maths IV, art and home economics. The boys' tendency to enrol in mathematics and physical sciences is further emphasized by the fact that chemistry, while among the eight common subjects, ranked only 1Øth with girls but second with boys.

TABLE 2

THE MOST HEAVILY ENROLLED YEAR 12 SUBJECTS: 1979

GIRLS		BOYS	
Number Enrolled		Number Enrolled	
*2289	English	*2222	English
*1728	Biology	*1205	Chemistry
*1336	Geography	*1198	Geography
*1256	Maths I	1137	Physics
*1213	Human Biology	*1058	Math I
846	Eng. Literature	* 940	Biology
* 769	History	* 900	Economics
627	Maths IV	802	Math II
* 597	Economics	802	Math III
* 546	Chemistry	* 549	History
543	Art	464	Accounting
527	Home Economics	* 459	Human Biol.

* Subjects common to both lists

As illustrated in Figure 2, which shows the proportion of girls to boys in Year 12 enrolments, there were marked differences in the ratio of the sexes in many subjects. For instance, home economics, early childhood studies and typing and business communication had female-to-male ratios ranging from 88:1 to 16:1. At the other extreme there were seven agricultural subjects, and technology, that are clearly boys' subjects. More details are found in Appendix II.

Features of the enrolment patterns are:

1. There were more girls than boys enrolled in all language courses, markedly so in French.

2. Girls outnumbered boys significantly in biology, human biology and maths IV.

3. In maths II, III, physics and chemistry, boys outnumbered girls significantly.

4. In social science and humanities there were less consistent trends. In geography and history there was no predominant sex. However, English literature and art enrolled more than twice as many girls as boys.

5. Economics, accounting and commercial law all had a predominantly male enrolment; technical drawing and applied technology had extremely high male enrolments.

6. In the competition for entrance to Western Australian universities, TAE subjects are rated differently. For purposes of entry to the University of W.A., and sometimes Murdoch University, marks gained in some TAE examinations are deemed to be worth only 40 per cent of marks gained in other subjects. The '40 per cent' subjects include human biology, home economics, speech and drama, applied technology, art, mathematics IV and and agricultural sciences. Four of these subjects were among the most popular dozen taken by girls in 1979, and only one was among the most popular dozen boys' subjects. As a result, girls comprised 70 per cent of students sitting for the '40 per cent' TAE subjects in 1979.

Clearly, there are marked sex differences in the subject choices of boys and girls in upper secondary school. Most subject enrolments are predominantly male or female. Boys tend to enrol in physical sciences and advanced mathematics; girls in cultural, linguistic, general science and less advanced mathematics subject areas. Vocationally, boys tend to enrol in technically oriented subjects, in contrast to girls' enrolment in stenography and typing and business communication.

Home Economics
Early Childhood Studies
Typing and Bus. Comm.
Applied Technology
Politics
Technical Drawing
90
80
70
60
50
40
30
20
10
1
10
Number of Girls to Each Boy
French
Human Biol., Art
English Literature
Science
Biology
Indonesian
Music
Math IV, Japanese
Italian
History, German
Math I
Geography
English, Local Area Studies
4
3
2
1
Number of Girls to Each Boy

FIGURE 2
SEX RATIOS OF YEAR 12
SUBJECT ENROLMENTS: 1979

3.0 CHANGES OVER TIME

This section looks briefly at trends in sex differences in participation rates in secondary school subjects over the past decade.

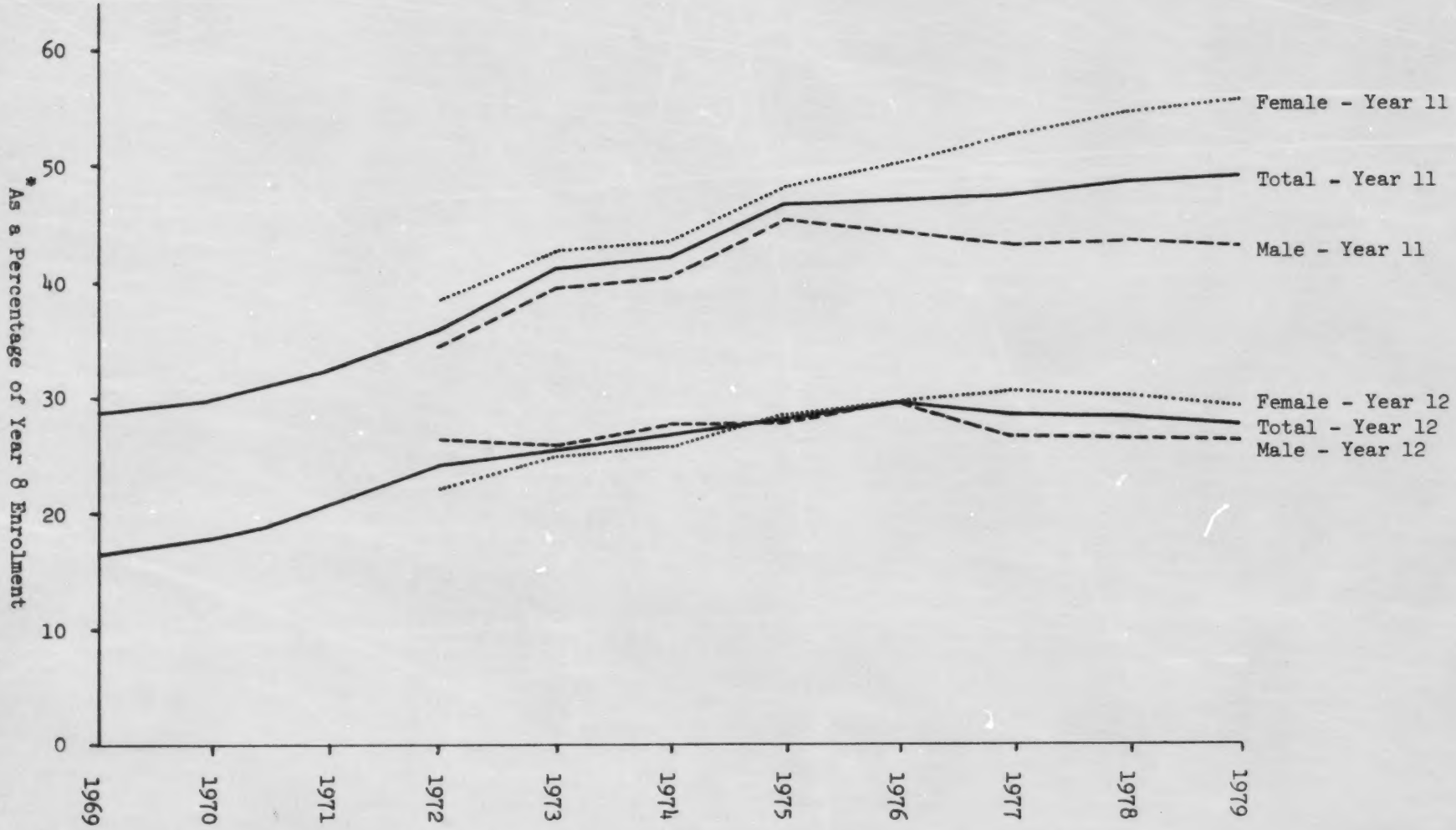
3.1 Retention Rates

Over the past decade, more and more students have chosen to remain at school beyond Year 10. In 1969 only 29 per cent of students went on to Year 11; by 1979 that proportion had risen to over one half. As well, the retention rate for Year 12 students increased from 16.5 per cent in 1969 to 28.5 per cent in 1979 (Figure 3).

There have also been important changes in the retention pattern of post-Year 10 students. In the latter 1960s, less than a third of Year 10 students committed themselves to Year 11 studies; however, once they did, three-quarters of them continued on to Year 12. By the latter 1970s, a far greater percentage of students (54%) continued from Year 10 to Year 11; however, a substantially smaller proportion of those (57%) continued on to Year 12. For whatever reasons, the end of Year 10 is no longer seen as such a crucial dividing line in secondary education as it formerly was. As well, enrolment in Year 11 is now less likely to mean that enrolment in Year 12 will follow. It is also of interest to note that in analysing the Year 11 retention rate trend over the past decade, the Alternative and Vocational Business Studies Courses account for less than half of the percentage increase; the majority of the students continuing to Year 11 today are doing so with respect to other factors.

FIGURE 3

RETENTION RATES* FOR YEARS 11 AND 12: 1969 - 1979



There are marked sex differences in these trends. In the latter 1960s, more boys than girls continued on to Years 11 and 12. By the latter 1970s, however, the situation had reversed; a greater proportion of girls than boys continued past Year 10. However, while more girls than boys now stay in school past Year 10, a disproportionately high percentage of girls enrol in terminal Year 11 courses, or otherwise leave at the end of Year 11.

Thus, the last decade has seen markedly increased retention rates and a diversification of alternatives in post-compulsory schooling. However, it is evident that there are great differences between boys and girls in terms of the duration and pattern of their education.

3.2 Subject Choice

To determine if there has been any evidence of change in enrolment patterns during the 1970s, an examination was made of enrolment patterns at the Year 10 level in 1974 and 1979, and of the tertiary-oriented Year 12 streams for 1972-1980.

A report by Ryan (1977) provides enrolment information for boys and girls in Year 10 Government schools in 1974. She examined language options, and all other options which had an enrolment greater than five per cent of the Year 10 cohort. This and comparable 1979 data are presented in Figure 4. There has been little overall change in the marked sex differences in participation rates. Boys and girls in 1979 were still taking subjects in approximately the same proportions as they were in 1974; only in French, Indonesian, Italian and typewriting personal have participation rates changed more than 10 per cent.

FIGURE 4
CHANGES IN YEAR 10 OPTION SUBJECT ENROLMENTS: 1974 - 1979

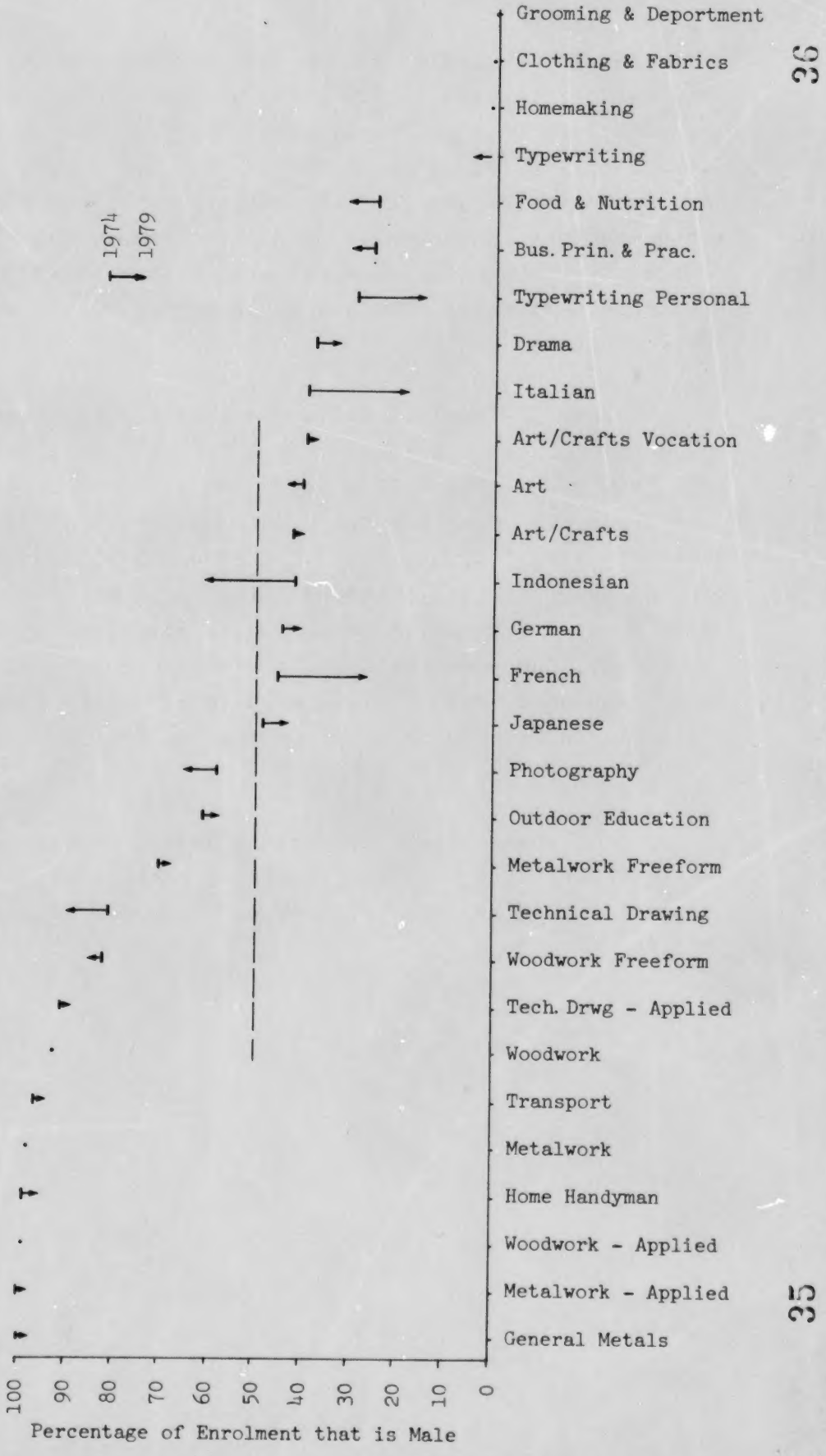


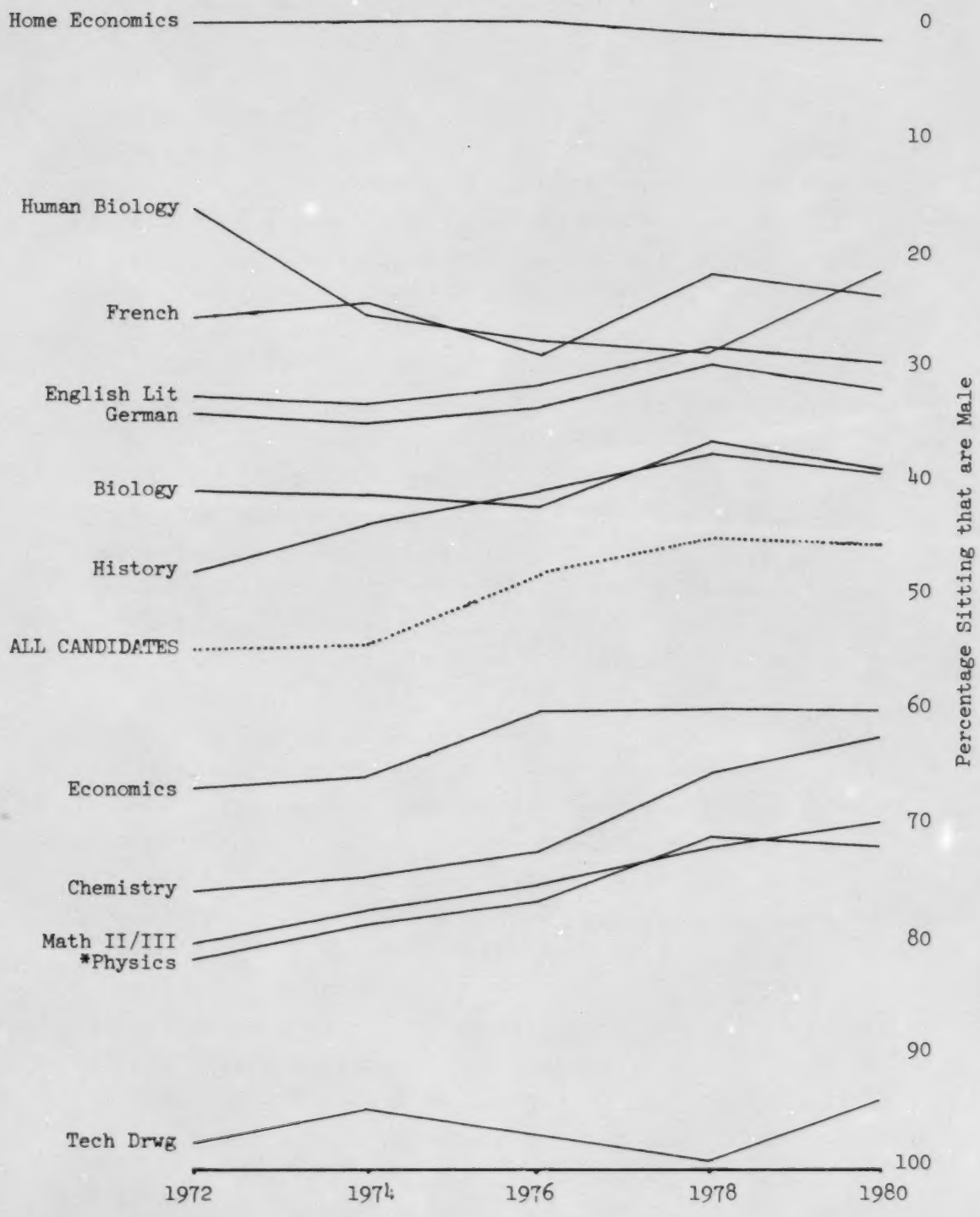
Figure 5 indicates the male/female percentages of those who sat for Leaving (1972, 1974) and TAE (1976, 1978, 1980) examinations in the past decade. Only subjects for which approximately 200 or more students sat are shown. Unlike other statistics presented in this report, Figure 5 includes both government and non-government secondary school students. However, detailed examination of 1979 figures indicate that state-wide and Government school trends are very similar.

At Year 12 level, some subjects with a relatively high proportion of male enrolment in 1972, such as chemistry, physics, maths II and III, have seen a slight decline in the proportion over the years. On the other hand, subjects that are almost exclusively single-sex (home economics and stenography for girls, and technical drawing and applied technology for boys), have varied little over the decade. Similarly, subjects enrolling predominantly girls, such as art, languages, and literature, have about the same ratio of girls to boys in their enrolment in 1980 as they did in 1972.

On the whole, there appears to have been only a slight net alteration in sex differences in participation rates in subjects at either Year 10 or Year 12 levels over the past decade.

FIGURE 5

PERCENTAGE OF STUDENTS SITTING
FOR SELECTED LEAVING (1972, 1974) AND
TAE (1976, 1978, 1980) SUBJECTS WHO WERE MALE



*Includes 'project physics' in 1976 and 1978

4.0 DIFFERENCES BETWEEN SCHOOLS

The discussion in the previous chapters was based on total enrolment figures of boys and girls. However, some questions arise when individual subjects are assessed on a school-by-school basis.

In many subjects, the enrolment pattern is similar for every school. For example, in every school in the State, enrolments in the Year 10 options of electronics, agriculture, plastics and technical drawing are dominated by boys. In every school, enrolments in Italian, graphic arts, spinning and weaving are dominated by girls. However, for some subjects there are variations from school to school. For example, in 1979 the Year 10 metal freeform option subject enrolled a total of 872 boys and 387 girls. Most of the 57 schools offering it enrolled predominantly boys and at least 15 schools enrolled only boys. However, four schools enrolled only girls, and another enrolled more girls than boys. Similarly, enrolment in business principles and practice is normally dominated by girls (2 100, compared to 670 boys). However, in four schools the enrolment of boys exceeded that of girls.

Similar enrolment trends are evident in Year 12. Some subjects, such as stenography, are dominated by girls in every school. Others, such as accounting, exhibit great enrolment variation from school to school. Overall, two-thirds of the accounting students were boys in 1979 and boys were in the majority in 35 schools; however, girls equalled or outnumbered boys in 19 schools.

It is not possible to interpret or explain these results in this report, since no investigation was made into whether or to what extent such patterns result from timetabling factors, from choices made by students, from differing

parental expectations in various locales, or from other reasons. However, while individual schools generally exhibit enrolment patterns that reflect the overall state male/female ratios, there is enough variation among some schools and subjects to raise interesting questions. The fact that a few schools do differ suggests that there is nothing immutable about the present sex participation rates. In this respect, the extent to which school policy influences matters is certainly a question which merits investigation.

4.1 Metropolitan and Non-Metropolitan Schools

Non-metropolitan secondary schools in Western Australia tend to differ in several respects from metropolitan schools. They are generally smaller; many are district high schools which, unlike metropolitan schools, include on the same campus both primary and secondary students; and many do not provide education past Year 10. The following outlines the similarities and differences between subjects taken by Years 10 and 12 boys and girls in metropolitan and non-metropolitan schools in 1979.

Figure 6 shows the relationship between the number of Year 10 students in each school and the number of subjects (including core) offered. The average number of subjects offered in metropolitan schools (33) is 50 per cent greater than in non-metropolitan schools (22) which largely reflects the different sizes of metropolitan and non-metropolitan schools. However, it does not always follow that small schools offer fewer subjects. The correlation between number of students and number of subjects offered is +.82 for non-metropolitan schools, but only +.54 for metropolitan schools.

FIGURE 6
NUMBER OF YEAR 12 STUDENTS IN SCHOOLS VERSUS
NUMBER OF SUBJECTS OFFERED: 1979

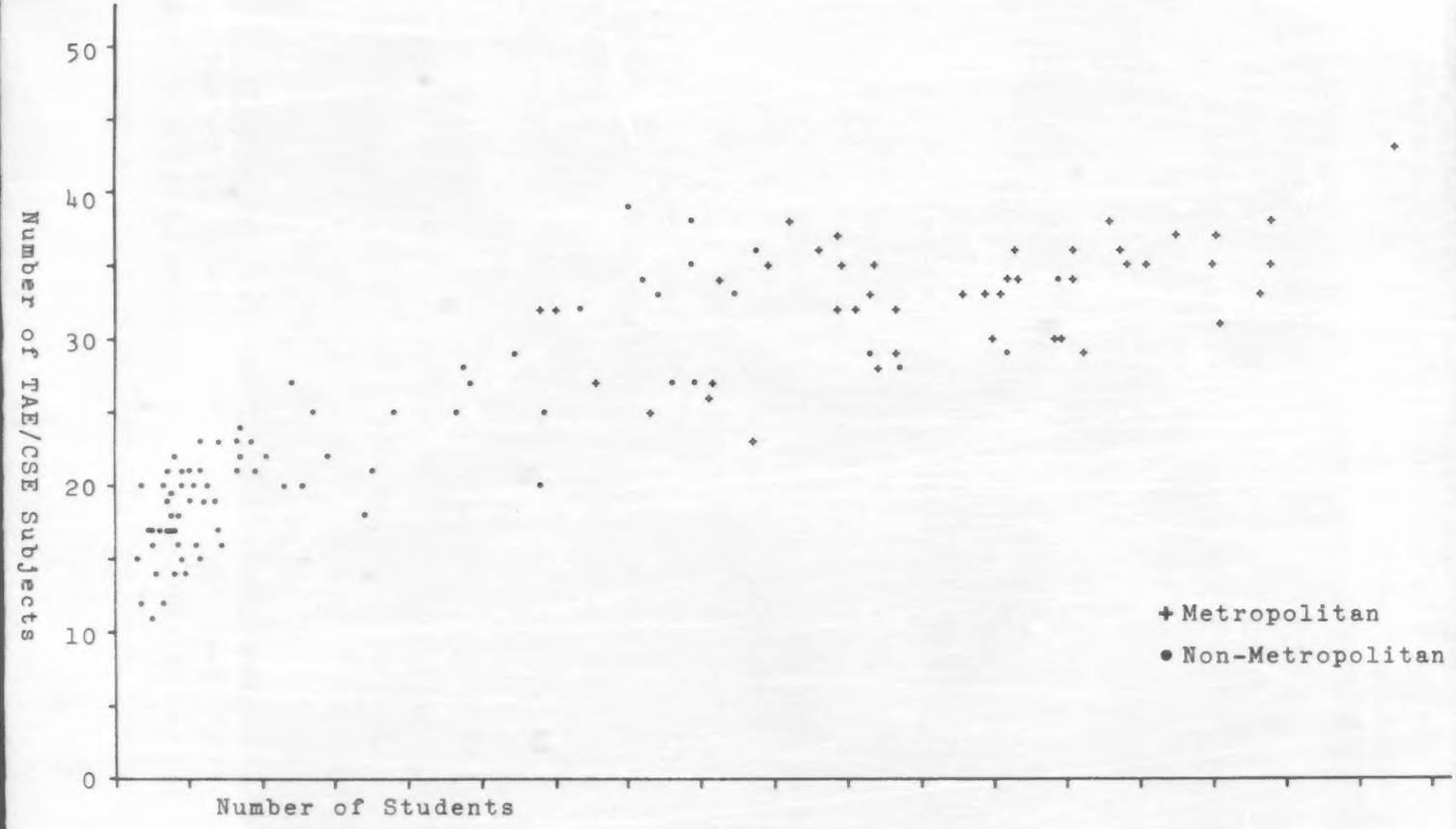


Table 3A lists the dozen most heavily enrolled Year 10 option subjects for metropolitan and non-metropolitan boys, respectively. Ten of the subjects are common to both lists, and the first eight subjects are even in the same rank order, except for one reversed pair.

Table 3B shows the dozen most heavily enrolled option subjects for metropolitan and non-metropolitan girls, respectively. The first 11 subjects are common to both lists and except for the greater popularity of clothing and fabrics in non-metropolitan schools, the rank orders are also identical.

Overall, of the 23 subjects involved, only four are common to both the boys' and girls' lists. In summary, there is little difference between metropolitan and non-metropolitan subject popularity for a given sex, but there is a great difference between the sexes.

Figure 7 shows the relationship between the number of Year 12 students in each school and the number of subjects offered. Metropolitan schools offered an average of only two more subjects (20) than non-metropolitan schools (18 subjects). Also, the range of subjects offered by metropolitan schools (15-26 subjects) was not much different from that of non-metropolitan schools (13-24 subjects). The correlation between number of students and number of subjects offered was +.68 for metropolitan schools and +.62 for non-metropolitan schools.

Table 4A shows that the 12 most common subjects chosen by metropolitan girls were identical with those chosen by non-metropolitan girls. However, the relative rankings varied somewhat (the rank-order correlation coefficient was +.76).

TABLE 3A

THE MOST HEAVILY ENROLLED YEAR 10 OPTION SUBJECTS - METROPOLITAN AND NON-METROPOLITAN: 1979.

(BOYS)

METROPOLITAN	Number Enrolled	NON-METROPOLITAN	Number Enrolled
Woodwork	1679	Woodwork	610
Metalwork	1239	Metalwork	489
Transport	972	Transport	379
Home Handyman	957	Technical Drawing	340
Technical Drawing	873	Home Handyman	284
Food & Nutrition	660	Food & Nutrition	201
Art/Crafts	606	Art/Crafts	188
Woodwork Applied	431	Woodwork Applied	186
Photography	426	Outdoor Education	166
Outdoor Education	409	Woodwork Freeform	166
General Metals	377	Metalwork Applied	163
Metalwork Freeform	361	Photography	115

TABLE 3B

(GIRLS)

METROPOLITAN	Number Enrolled	NON-METROPOLITAN	Number Enrolled
Food & Nutrition	2758	Food & Nutrition	1435
Typewriting	2235	Typewriting	1213
Art/Crafts	1562	Clothing & Fabrics	1145
Business Principles and Practice	1453	Art/Crafts	855
		Business Principles and Practice	647
Typewriting Personal	1308	Typewriting Personal	643
Grooming & Deportment	1258	Grooming & Deportment	602
Clothing & Fabrics	1194	Homemaking	408
Homemaking	845	Drama	331
Drama	771	Outdoor Education	329
Outdoor Education	686	Photography	255
Photography	536	Child Care	205
French	515		

The dozen most common subjects chosen by metropolitan boys (Table 4B) was the same as for non-metropolitan boys, with one exception: for non-metropolitan boys technical drawing displaced history - by one enrolment.

To consider the possibility that some schools' sex differences in enrolment arise because of disproportionate enrolment in the school of boys and girls, the ratio of boys to girls for each subject was compared with the school's absolute male-female enrolment ratio, on a school-by-school basis. From the results a second 'femaleness/maleness' ranking of subjects was compiled and compared to Appendix II. The rank order correlation coefficient was +.96; there was very little difference between them.

In terms of subject choice, the above suggests that Years 10 and 12 non-metropolitan students show very similar subject choice patterns to their metropolitan counterparts. Conversely, the metropolitan male and female students, with generally more subjects to choose from, select generally the same dozen most popular subjects as their non-metropolitan counterparts.

FIGURE 7

NUMBER OF YEAR 12 STUDENTS IN SCHOOLS VERSUS
NUMBER OF SUBJECTS OFFERED: 1979

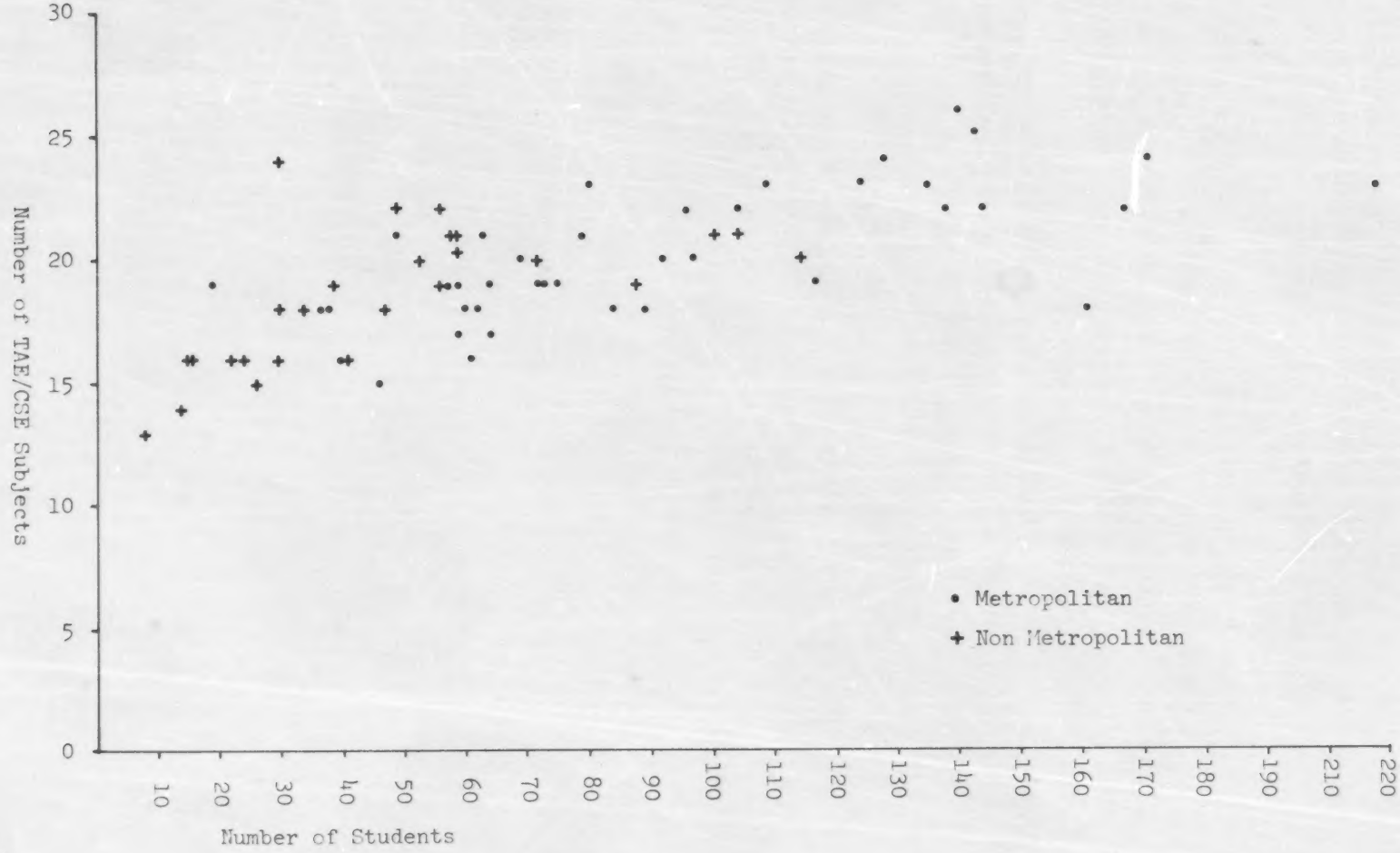


TABLE 4A

THE MOST HEAVILY ENROLLED YEAR 12 SUBJECTS - METROPOLITAN AND NON-METROPOLITAN: 1979

(GIRLS)

METROPOLITAN	Number Enrolled	NON-METROPOLITAN	Number Enrolled
English	1679	English	610
Biology	1239	Biology	489
Maths I	972	Geography	379
Geography	957	Human Biology	340
Human Biology	873	Maths I	284
English Lit.	660	Maths IV	201
History	606	Economics	188
Chemistry	431	English Lit.	186
Maths IV	426	Art	166
Economics	409	Home Economics	166
Art	377	History	163
Home Economics	361	Chemistry	115

TABLE 4B

(BOYS)

METROPOLITAN	Number Enrolled	NON-METROPOLITAN	Number Enrolled
English	1736	English	486
Chemistry	973	Geography	254
Geography	944	Biology	242
Physics	911	Chemistry	232
Maths I	843	Physics	226
Biology	698	Maths I	215
Economics	696	Economics	204
Maths II	621	Maths II	181
Maths III	621	Maths III	181
History	460	Accounting	113
Human Biology	355	Human Biology	104
Accounting	351	Tech. Drawing	90
		History	89

5.0 WHEN DO SEX DIFFERENCES START?

The tendency for most option subjects or courses to be predominantly male or female already has been indicated for Year 12 (section 2.4), Year 11 (section 2.3), and Year 10 (section 2.1). For the purposes of this study, Year 9 data was not analysed in detail because a preliminary survey of enrolment patterns suggested that they resembled those of Year 10.

The pattern for Year 8 is in several respects similar to later years, but has also been undergoing change. There has been a deliberate attempt on the part of numerous schools to introduce all students to subjects formerly considered suitable for one sex only. Consequently, a number now require all Year 8 students to take a variety of option subjects for several weeks each, using a 'rotating option' schedule.

Table 5 indicates the enrolment pattern of Year 8 boys and girls in four subjects traditionally viewed as being male or female. The first two columns indicate the

TABLE 5

ENROLMENT PATTERN OF SELECTED YEAR 8 OPTIONS: 1979

	Percentage of schools with 98% or more female enrolment	Percentage of schools with 98% or more male enrolment	Percentage of schools with roughly equal M/F enrolment	Percentage of schools not listing the subjects or not fitting other columns
Clothing & Fabric	76	0	9	15
Food & Nutrition	45	0	34	21
Metalwork	0	66	12	12
Woodwork	0	46	31	23

percentage of schools enrolling 98% or more students of one sex. This figure is chosen because while many schools have single-sex enrolments in these subjects, it is not unusual for schools to enrol one or two students of the opposite sex.

For Year 8, clothing and fabric is still essentially a girls-only subject in 76 per cent of the schools, and metalwork is taken almost exclusively by boys in 66 per cent of schools. However, the food and nutrition and woodwork subjects show a substantially different pattern. In about one-third of all schools, approximately equal numbers of males and females enrolled in these subjects (column 3). As well, many schools using a 'rotating option' schedule do not report enrolment figures to the BSE (these schools are included in column 4). Thus, even more schools than are recorded in the third column are known to enrol both boys and girls. The net result is that only 45 per cent of schools enrol essentially girls only in food and nutrition, and 66 per cent boys only in metalwork.

In conclusion, there is clearly a pattern of markedly different sex-participation rates in most option subjects in every year of secondary schooling, beginning in Year 8. While Year 9 enrolments have not been reported here, they are similar to Year 10 in showing an extremely strong pattern of sex differences in most subject enrolments. Obviously a lot of questions are going begging. Why, in those first years of option subject choice - Years 9 and 10 - do enrolments show the pattern they do? Why, in Year 8, when most students have no choices, is there such a marked sexual dichotomy of 'option' subjects as well? What is the basis for this set of circumstances? What is the role of school policies and practices?

6.0 CONCLUSION

6.1 Summary

1. In most subjects which involve student choice, enrolments are predominantly single sex, and in many cases nearly exclusively so. In Year 10 for example, in no school was there an enrolment of both boys and girls in every subject. On average, each school offered four subjects exclusively to girls, and six exclusively to boys.

2. In lists of the dozen most popular 1979 Year 10 option subjects for boys and for girls, only four were common to both lists. Girls tended toward art/craft, home economics, secretarial and culturally-oriented subjects; boys tended towards manual arts, technological and scientific options.

3. Of the dozen most popular 1979 Year 12 subjects for boys and girls, eight are common. Of the subjects not common to both sexes, boys preferred physics, mathematics II and III, and accounting; girls preferred mathematics IV, English literature, art and home economics.

4. Girls comprised 70 per cent of the students sitting for the TAE '40 per cent subjects' in 1979.

5. There has been a greatly increased retention rate past Year 10 over the past decade. Now more girls than boys continue to Year 11; however, proportionately more girls also enrol in terminal Year 11 courses or otherwise leave at the end of the year.

6. Ninety-seven per cent of students studying for the Vocational Business Studies Certificate in 1980 were female.

7. Three-quarters of students enrolled in Alternative Courses in 1980 were male.

8. Two-thirds of 14 and 15 year olds enrolled in TAFE courses in 1980 were male. Virtually all TAFE pre-apprenticeship students are male.

9. Apprenticeship programmes, except for hairdressing, are the domain of males.

10. For both Years 10 and 12 in only a handful of subjects has there been a notable change in sex participation ratios over the past several years; those subjects that are almost exclusively single-sex have exhibited among the least change.

11. Most subjects show a very similar sex-participation rate in most schools. However, in a few subjects there are notable variations from school to school - Year 12 accounting is a good example.

12. For each sex, respectively, there is very little variation between metropolitan and non-metropolitan schools in terms of the dozen most popular subjects and their ranks.

13. Sex differences in course and subject participation rates are apparent in all years of secondary schooling.

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6.2 Discussion

Our society is undergoing considerable change in which traditional concepts as to the roles and place of men, women and schools are being questioned. For Australian society as a whole, these issues have been discussed, for example, in the Meyers (1980) Report on 'Technological Change in Australia'. For schools in particular, the Schools Commission Report (1980) had much to say on the matter.

Subject choices, to which students formally commit themselves in school, take place within the broader context of social expectation of what is appropriate for boys and girls. There are complex pressures and influences brought to bear upon the student and school; many are poorly understood. Sex-based enrolment in many school subjects is an example of social differentiation between girls' and boys' roles. It involves a variety of attitudes, beliefs and perceptions that are not always explicitly written, spoken or even recognized by many.

In 1976 a report on 'Males and Females in the State Education System of Western Australia' was submitted to the Minister for Education (Stewart 1976). Among several aspects, the report looked at organizational and administrative practices in schools which unnecessarily differentiated between students on the basis of sex; it also investigated whether or not the availability of courses to students was limited or biased on the basis of sex. Subsequently, the office of the Director-General of Education issued Policy Paper No. 23 - 'Equality in Education with Particular Reference to Women and Girls' - which urged schools and teachers to examine their organizations, time-tabling procedures, classroom techniques, attitudes and behaviours so as to work toward the elimination of unnecessary sex-based policies and practices.

As it involves a statistical examination of enrolment patterns, this report cannot draw implications which help school staff members who are interested in evaluating or altering the patterns of sex differences emerging in their own schools. However, this report has presented evidence suggesting that there has been little effective change in subject choice over the past decade. This is particularly interesting since efforts are being made, at the Departmental level and by many schools and individuals, to eliminate unnecessary sex-based subject enrolment. This situation raises important questions. What effects do school policies and practices have on girls' and boys' subject choices? What are the philosophical and practical bases upon which these efforts have been predicated? What are the results of these efforts? How have they been perceived and received?

To explore some of these questions and, therefore, to provide a better basis for action by school staff, a follow-up research project is being conducted during 1981. The major focus of the study will be on clarifying the role of school policies and practices in determining the sex differences in subject choice which have been described. The results of the study will be available in early 1982.

APPENDIX I

YEAR 10 OPTION SUBJECTS OFFERED IN 1979

SUBJECT	BSE No.	Number of Schools	1979 ENROLMENTS		
			Metro Schools	Non-Metro Schools	Total M/F in all Schools
Food and Nutrition	793	123	1411(M) 2758(F)	683(M) 1435(F)	2094(M) 4193(F)
Metalwork	495	122	2257 53	1503 24	3760 77
Typewriting	788	122	144 2235	56 1213	200 3448
Clothing and Fabrics	795	120	15 1194	6 1145	21 3099
Woodwork	498	120	2857 110	1524 144	4381 254
Art/Crafts	698	117	1189 1562	629 855	1818 2417
Technical Drawing	486	114	1801 186	855 81	2656 81
Typewriting-Personal	787	93	217 1308	153 643	370 1951
Woodwork-Applied	497	89	1112 12	538 1	1650 13
Physical Education	893	88	4248 3965	1776 1683	6024 5648
Business Princ. & Prac.	796	87	466 1453	204 647	670 2100
Transport	490	86	2047 73	929 40	2976 113
Metalwork-Applied	494	84	544 11	458 2	1002 13
Home Handyman	491	79	1880 48	715 26	2595 74
Homemaking	791	73	14 845	9 408	23 1253

SUBJECT	BSE No.	Number of Schools	1979 ENROLMENTS		
			Metro Schools	Non-Metro Schools	Total M/F in all Schools
Photography	295	69	1101(M) 536(F)	429(M) 255(F)	1530(M) 791(F)
Art/Crafts/ Vocation	697	67	262 419	150 189	412 608
Drama	682	57	388 771	176 331	564 1102
Metalwork Freeform	493	57	645 311	227 76	872 387
French	599	56	206 515	44 131	250 646
Grooming & Department	995	56	18 1258	4 602	22 1860
Woodwork Freeform	496	52	563 118	465 68	1028 186
Tech. Drawing Applied	485	47	358 41	122 5	480 46
Outdoor Education	895	45	968 686	495 329	1463 1015
General Metals	492	41	965 10	302 12	1267 22
Music Instrumental	687	36	174 209	29 28	203 237
Media Studies	992	32	535 412	65 60	600 472
Mathematics Enrichment	199	28	305 211	82 46	387 257
Religious Education	892	25	14 12	9 11	23 23

SUBJECT	BSE No.	Number of Schools	1979 ENROLMENTS		
			Metro Schools	Non-Metro Schools	Total M/F in all Schools
Computer Studies	197	24	377(M) 217(F)	25(M) 19(F)	402(M) 236(F)
Music Class.	689	22	21 185	189 58	210 243
Film Making	994	21	286 184	91 56	377 240
German	597	18	102 138	20 26	122 164
Art	699	18	28 49	22 9	50 58
Speech	684	18	257 271	64 109	321 380
Child Care	771	17	0 262	1 205	1 467
Italian	595	17	101 230	5 25	106 255
Consumer Education	798	16	53 67	14 23	67 90
Plastics	482	15	427 65	124 33	551 98
Youth Leadership	883	13	119 103	32 18	151 121
Personal Development	989	10	0 269	11 191	11 460
Jewellery	461	9	105 250	38 50	143 300
Pottery	691	9	12 19	78 115	90 234
Shorthand	789	9	1 151	0 10	1 161
Hostessing	778	8	3 123	0 73	3 196

SUBJECT	BSE No.	Number of Schools	1979 ENROLMENTS		
			Metro Schools	Non-Metro Schools	Total M/F in all Schools
Japanese	591	8	71(M) 87(F)	Ø(M) Ø(F)	71(M) 87(F)
Physical Recreation	873	8	220 121	48 45	268 166
Animal Husbandry	477	7	24 37	29 6	53 43
Dance	890	7	Ø 121	10 11	10 132
Electronics	297	7	102 2	71 Ø	173 2
Farming	480	7	44 10	90 7	134 17
Graphic Art	694	7	175 127	29 7	204 134
Gymnastics	881	7	19 70	14 27	33 97
Physical Ed. Special	884	7	190 127	39 22	229 149
Speech & Drama	683	7	64 59	9 35	73 94
Agriculture	476	6	3 Ø	62 26	65 26
Bookkeeping	797	6	27 36	4 23	31 59
Lapidary	481	6	10 7	54 14	64 21
Writing	099	6	123 135	Ø 1	123 136
Bachelor Course	774	5	Ø Ø	91 29	91 29
Ballroom Dancing	997	5	16 96	34 82	50 178
Boating	499	5	71 5	67 5	138 10

SUBJECT	BSE No.	Number of Schools	1979 ENROLMENTS		
			Metro Schools	Non-Metro Schools	Total M/F in all Schools
Drama and Film-making	681	5	33(M) 47(F)	14(M) 35(F)	47(M) 82(F)
Electricity	489	5	133 3	24 0	157 3
Indonesian	593	5	42 25	0 0	42 25
Science Enrichment	294	5	38 6	2 3	40 9
Clothing and Fabric Enrichment	782	4	0 1	0 18	0 19
Farm Handyman	479	4	114 170	14 0	128 170
Music A	686	4	40 46	0 1	40 47
Music-Special	693	4	22 32	0 0	22 32
Retail Trade	790	4	6 31	16 6	22 37
Cadets - Army	996	3	62 0	0 0	62 0
Cake Decorating	783	3	1 28	1 62	2 90
Commerce	799	3	39 81	1 0	40 81
Cookery	780	3	100 0	22 0	122 0
Drawing	487	3	2 2	0 0	2 2
Food and Nutrition Enrichment	776	3	2 22	0 7	2 29
Horticulture	438	3	11 17	5 2	16 19

SUBJECT	BSE No.	Number of Schools	1979 ENROLMENTS		
			Metro Schools	Non-Metro Schools	Total M/F in all Schools
Industrial Arts	435	3	103(M) 31(F)	1(M) 0(F)	104(M) 31(F)
Literature	839	3	13 29	0 0	13 29
Model Making	473	3	52 1	40 0	92 1
Music	688	3	0 0	9 13	9 13
Social Educ.	862	3	127 159	1 0	128 159
Communication	092	2	0 0	26 4	26 4
Community Health	898	2	0 0	1 34	1 34
Community Service	885	2	4 29	0 0	4 29
Conversational Italian	585	2	1 0	2 8	3 8
Embroidery	775	2	0 0	1 5	1 5
Handcrafts	773	2	0 64	0 10	0 74
Home Economics	792	2	30 56	0 76	30 132
Jazz Ballet	987	2	0 38	1 52	1 90
Music B	685	2	3 5	0 0	3 5
Navigation	985	2	19 0	0 1	19 1
Physiology and Hygiene	894	2	87 55	0 0	87 55
Spinning/ Weaving	768	2	1 23	1 4	2 27

SUBJECT	BSE No.	Number of Schools	1979 ENROLMENTS		
			Metro Schools	Non-Metro Schools	Total M/F in all Schools
Welding	465	2	Ø(M) Ø(F)	28(M) Ø(F)	28(M) Ø(F)
Chess	869	1	Ø Ø	1 Ø	1 Ø
Communication Studies	986	1	6 10	Ø Ø	6 10
Conversational French	587	1	Ø Ø	Ø 1	Ø 1
Craft	-	1	1 Ø	Ø Ø	1 Ø
Cropping	460	1	Ø Ø	2 3	2 3
Cultural Enrichment	864	1	3 7	Ø Ø	3 7
Elementary Desssmaking	794	1	Ø Ø	Ø 6	Ø 6
Field Biology	462	1	9 Ø	29 11	38 11
First Aid	861	1	9 15	Ø Ø	9 15
Geology	298	1	13 7	Ø Ø	13 7
History Option	837	1	4 11	Ø Ø	4 11
Home Management	772	1	Ø 23	Ø Ø	Ø 23
Horsemanship	888	1	Ø Ø	Ø 8	Ø 8
Life Sciences	-	1	Ø Ø	2 8	2 8
Local History	867	1	Ø Ø	2 2	2 2

SUBJECT	BSE No.	Number of Schools	1979 ENROLMENTS		
			Metro Schools	Non-Metro Schools	Total M/F in all Schools
Plantation Agriculture	439	1	0(M) 0(F)	4(M) 4(F)	4(M) 4(F)
Radio	296	1	19 0	0 0	19 0
Specialized Cookery	785	1	0 0	5 0	5 0
Television	981	1	25 10	0 0	25 10
Theatre Arts I	983	1	0 1	0 0	0 1
Theatre Arts II	982	1	8 8	0 0	8 8
Current Affairs	385	1	0 0	5 1	5 1
Modern Languages	-	1	2 9	0 0	2 9

APPENDIX II

RANKING OF 'FEMALENESS/MALENESS' OF YEAR 12 SUBJECTS: 1979

	SUBJECT	SEX RATIO	NO. ENROLLED	
			Male	Female
1.	Stenography	48:0*	0	48
2.	Home Economics	87.8:1	6	527
3.	Early Childhood Studies	27.0:1	1	27
4.	Typing & Business Communication	15.9:1	8	127
5.	French	3.95:1	56	221
6.	Art	2.65:1	205	543
7.	Human Biology	2.64:1	459	1213
8.	English Literature	2.47:1	343	846
9.	Science	2.00:1	1	2
10.	Biology	1.84:1	940	1728
11.	Indonesian	1.80:1	10	18
12.	Music	1.66:1	35	58
13.	Japanese	1.62:1	29	47
14.	Mathematics IV	1.61:1	389	627
15.	Italian	1.48:1	40	59
16.	History	1.40:1	549	769
17.	German	1.40:1	47	66
18.	Mathematics I	1.19:1	1058	1256
19.	Geography	1.12:1	1198	1336
20.	English	1.03:1	2222	2289
21.	Local Area Studies	1.00:1	1	1

Ratio of girls to boys

SUBJECT	SEX RATIO	NO. ENROLLED Male	Female
21. Local Area Studies	1.00:1	1	1
22. Media Studies	1.31:1	38	29
23. Physical Science	1.37:1	148	108
24. Agricultural Science	1.40:1	7	5
25. Accounting	1.51:1	464	307
26. Economics	1.51:1	900	597
27. Technology	1.60:1	8	5
28. Speech and Drama	1.67:1	10	6
29. Agricultural Studies	1.83:1	11	6
30. Mathematics II	1.92:1	802	418
31. Chemistry	2.21:1	1205	546
32. Mathematics III	2.53:1	802	317
33. Physics	2.80:1	1137	406
34. Commercial Law	3.28:1	23	7
35. Geology	3.86:1	27	7
36. Technical Drawing	12.10:1	351	29
37. General English	57.00:1	114	2
38. Farm Construction	58.50:1	117	2
39. Applied Technology	58.71:1	176	3
40. Animal Husbandry	112.00:1	112	1
41. Crops & Pastures	112.00:1	112	1
42. Farm Economics & Manage.	112.00:1	112	1
43. Farm Practise	112.00:1	112	1
44. Motors and Machines	121.00:0*	121	0
45. Politics	7.00:0*	7	0

Ratio of boys to girls ↓

* These three subjects have no members of the opposite sex enrolled in them; thus their ratios are actually infinite.

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